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Management Sciences Division
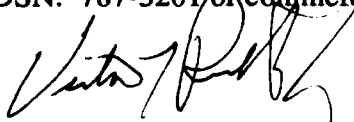
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Directorate of Plans and Programs
HQ Air Force Materiel Command
Wright-Patterson AFB OH 45433

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FOREWORD

The Management Sciences Division (HQ AFMC/XPS) conducts and sponsors studies and research of significant materiel issues. Our focus is on the development, modification, and application of mathematical models which can help relate resource alternatives to the peacetime readiness and wartime sustainability of AFMC's customers--the operating commands.

This is our tenth Annual Report. It includes descriptions of the projects we worked on in 1993 and our plan for 1994. If you have any comments, or suggestions for further research, contact us at DSN: 787-3201 or commercial 513-257-3201.

VICTOR J. PRESUTTI, JR.
Chief, Management Sciences
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STEPHEN P. CONDON
Major General, USAF
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EXECUTIVE SUMMARY

The Management Sciences Division (HQ AFMC/XPS) conducts and sponsors studies and research of significant materiel issues. We use, modify, and develop new or improved methods, models, and tools to manage materiel resources.

Our goal is to quantify the relationships between alternative materiel resources and the resultant aircraft availability and sustainability so that AFMC can prioritize and justify its investments in those resources. We work toward this goal by performing studies for our customers and by pursuing a few internally developed projects which have significant potential for providing valuable insights into these relationships.

In 1993 we focused on seven major areas. We were instrumental in helping the Air Force Materiel Command (AFMC), and the Air Staff, allocate spares procurement funds--when the obligation authority was less than the requirement--so as to minimize the negative impact on the Air Force's front line weapon systems ("Banding"). We continued our effort to help AFMC's Air Logistics Centers (ALCs) implement an approach that ensures that the items most in need of repair and/or distribution to support the operators' sortie generation capability will get priority attention ("DRIVE"). We contributed to an Air Force/AFMC initiative to improve repair, procurement, and distribution processes to simultaneously reduce resupply times and cut costs ("Lean Logistics"). We developed, and are helping implement, the approach that will be used to assess AFMC's contribution to the operators' 180 day war fighting capability ("War Fighting Metrics"). We worked with the Joint Logistics System Center (JLSC) to see if a multi-echelon spares requirements modeling strategy can be implemented that will satisfy all the Services' needs ("JLSC Support"). We worked with the C-17 System Program Office to evaluate a number of maintenance alternatives for the C-17 engine and its modules ("C-17 Engine"). We established, and are implementing, a program that will help senior operators better understand the capabilities and constraints of logistics support in a combat situation ("Wartime Logistics Awareness").

We expect that we will continue to focus on these major areas in 1994.

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THE MANAGEMENT SCIENCES DIVISION

The function of the Management Sciences Division (HQ AFMC/XPS) is to provide a source of operations research skills for the Headquarters. Although we are a part of the Directorate of Plans and Programs, we often perform our studies and analyses for clients outside the Directorate.

The majority of our analysts have advanced degrees in technical areas such as operations research, mathematics, engineering, and management sciences. Each new analyst is expected to have, or obtain within a three to four year training period, an appropriate advanced degree.

Our emphasis has been on the application of mathematical modeling techniques to improve the management of materiel resources. We have focused our efforts on the development and enhancement of mathematical models which can relate materiel resource decisions to resultant impacts on aircraft availability so that AFMC can prioritize and justify its investments in those resources. We work toward accomplishing this by performing studies for our customers and by pursuing a few internally developed projects which have significant potential for providing valuable insights into these relationships. The Division works closely, and shares results, with other governmental and private analysis organizations.

In 1993 we focused on seven major areas. We were instrumental in helping the Air Force Materiel Command (AFMC), and the Air Staff, allocate spares procurement funds--when the obligation authority was less than the requirement--so as to minimize the negative impact on the Air Force's front line weapon systems ("Banding"). We continued our effort to help AFMC's Air Logistics Centers (ALCs) implement an approach that ensures that the items most in need of repair and/or distribution to support the operators' sortie generation capability will get priority attention ("DRIVE"). We contributed to an Air Force/AFMC initiative to improve repair, procurement, and distribution processes to simultaneously reduce resupply times and cut costs ("Lean Logistics"). We developed, and are helping implement, the approach that will be used to assess AFMC's contribution to the operators' 180 day war fighting capability ("War Fighting Metrics"). We worked with the Joint Logistics System Center (JLSC) to see if a multi-echelon spares requirements modeling strategy can be implemented that will satisfy all the Services' needs ("JLSC Support"). We worked with the C-17 System Program Office to evaluate a number of maintenance alternatives for the C-17 engine and its modules ("C-17 Engine"). We established, and are implementing, a program that will help senior operators better understand the capabilities and constraints of logistics support in a combat situation ("Wartime Logistics Awareness").

We expect that we will continue to focus on these major areas in 1994.

The next two sections of this report contain specifics, by function, of our 1993 accomplishments and our planned program for 1994.

THE ANALYTIC APPLICATIONS FUNCTION

INTRODUCTION

The Analytic Applications Function focuses on improving policies and technical methodology for achieving the greatest possible combat capability at affordable costs of logistics resources. Most of our work involves issues related to (1) requirements computations of recoverable item spares for support of peacetime operations, (2) requirements computations of recoverable item spares for achieving combat capability objectives during a wartime surge period, (3) weapon system capability assessments due to recoverable item spares support policies, inventory status, and buy and repair budgets, and (4) repair and distribution prioritization actions at the depot to achieve the best possible weapon system peacetime readiness and wartime sustainability. Most of our efforts directly relate to these four areas.

We have the Air Force technical responsibility for three recoverable item spares requirements models. The Aircraft Availability Model (AAM) is embedded in the Recoverable Item Requirements system (D041). It incorporates aircraft availability objectives into the computation process for peacetime operating stock. The Dyna-METRIC model is the wartime capability tool used by the Sustainability Assessment Module (SAM) of the Weapon System Management Information System (WSMIS). The Aircraft Sustainability Model (ASM) is the computational technique employed by WSMIS/ REALM to identify wartime spares requirements. We work closely with WSMIS developers and users throughout the Air Force and in other agencies to ensure a continuing ability to properly apply these models.

We also have the technical responsibility for the Distribution and Repair In Variable Environments (DRIVE) model. This model is being used to prioritize the repair and distribution of recoverable items based upon the marginal gain in operational capability. Our past efforts were directed toward formulating the concept, defining the requirements, developing the production version of the DRIVE model, resolving system issues, and developing a strategy for the implementation of DRIVE. In 1993 we continued to provide the principal technical leadership and support for development and implementation of the production DRIVE system. We also focused on extending the user base of a DRIVE innovation, DeskTop DRIVE, which is a personal computer version of the model that allows field organizations to become hands-on functional users of the model.

The Analytic Applications Function includes nine operations research analysts and a logistics staff officer. We actively assist the AFMC staff and other Air Force agencies in incorporating improved methodologies in their management of logistics resources.

ACCOMPLISHMENTS IN 1993

In 1993 we focused on five primary efforts. These were: (1) Develop a methodology to allocate limited 1994 spares procurement obligation authority (funding) by considering the logistics health and relative importance of each weapon system. (2) Develop the AFMC Warfighting Metric to assess capability beyond the first 30 days of war. Accomplish this by linking Dyna-METRIC and DRIVE to incorporate expected depot support for assessments up to 180 days of war. (3) Design and implement the production DRIVE system to enable AFMC to provide substantially greater support to the combat commands by making depot maintenance and distribution actions more responsive to near-term sortie generation requirements. (4) Help AFMC and the Joint Logistics System Center (JLSC) determine an appropriate multi-echelon spares requirements modeling strategy for all services. (5) Complete the contract award for development of logistics wargaming seminars for senior operators to better understand the limitations that could be imposed upon planned operations due to logistics constraints.

In addition, we worked numerous other analysis issues. We extended our previous work on the Readiness Based Initial Requirements Determination (RBIRD) model to apply readiness based sparing techniques to the initial provisioning process for foreign military sales. We continued to support the analytic needs of a major multi-functional effort to improve the quality of the data feeding the AFMC requirements computation system. We worked to complete the evaluation of the Logistics Assessment Models (LAMs) which are used by System Program Directors (SPDs) to estimate the impact of future spares funding on weapon system capability. We were a key contributor to a major AFMC presentation to the SECDEF appointed Readiness Task Force on how the Air Force estimates future weapon system readiness. We supported the AFMC staff with several analysis efforts that included forecasting weapon system readiness for expected future spares funding, examining the causes of inactive inventory, analyzing Air Force versus Navy aviation depot costs, applying analysis tools for quick analysis of specific issues, and forecasting acquisition manpower based on projected budgets. We continued our support to the development and implementation of WSMIS and developed a new software linkage of DRIVE and Dyna-METRIC to help assess the impact of depot support on operational capability. Finally, we started new work that includes applying DRIVE to achieve depot process improvements and analyzing the factors that drive demands for aircraft parts.

TITLE: *RSD Banding for Effectiveness*

CUSTOMER: HQ AFMC/LG/FM/XR

OBJECTIVE: Assist AFMC in allocating its 1994 Obligation Authority (OA) by ALC and Weapon System and provide item level guidance to the Reparable Stock Division (RSD) item managers.

RESULTS: We developed a methodology using the Aircraft Availability Model to produce a shopping list of RSD items while considering the health of each weapon system and its relative importance as defined by weapon system priority bands. From the item level shopping list, we can accumulate procurement costs by weapon system and ALC. This breakout can be used by HQ AFMC/FM to allocate the FY 94 OA. The shopping list can then be used by item managers as a guide to spending the OA once they receive it. A briefing (given to VISIONS VI) of this process has been documented in XPS Working Paper 93-07A. This project was ongoing at the end of 1993 and will continue into 1994.

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TITLE: *War Fighting Metrics for AFMC*

CUSTOMER: HQ AFMC/XPO, HQ AFMC/LGI

OBJECTIVE: Help AFMC determine its ability to provide required wartime logistics support to the operating forces and provide a convenient means to track the indicators at regular intervals. Indicators of AFMC's contribution to wartime mission effectiveness are desired at high levels (e.g., HORIZONS). They are also useful for MAJCOMs, System Program Directors (SPDs), and item managers.

RESULTS: We began this effort in late 1992 with a design team and a plan for the WSMIS contractor to develop a measurement system by the end of 1993. Funding limitations led us to develop the system ourselves.

We produced an Initial Operating Capability (IOC) War Fighting Metric system on schedule which translates data from Production DRIVE into sorties for a 6-month war. The system applies DRIVE, Dyna-METRIC, and several Commercial-Off-The-Shelf (COTS) computer programs to generate capability assessments for all weapon systems in a few hours on a PC.

The measures produced by this system are indicative of AFMC support in that they show the expected impact of depot repair, distribution, and buy actions upon sortie generation capability and aircraft availability.

We expect to deliver the Full Operating Capability (FOC) version of War Fighting Metrics by July 1994.

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TITLE: *Support to the Development and Implementation of DRIVE*

CUSTOMER: HQ AFMC/LGI/XPS, ALCs, MAJCOMs

OBJECTIVE: Support the implementation of the AFMC DRIVE Production System (D087J/K) and the DeskTop DRIVE extension of the Production System. Distribution and Repair in Variable Environments (DRIVE) is being implemented to closely link recoverable item depot repair and distribution actions to operational customers' needs. The benefits of implementing this system are that we can make the best use of available spares and depot resources to satisfy customer support requirements in both peacetime and wartime. We are the Air Force technical OPR for the DRIVE model and technical consultant to the DRIVE Functional Integration Office and Program Management Office.

RESULTS: In 1993, we designed and implemented a number of modifications to the DRIVE model. These included changes to achieve Alternatives to Intermediate Maintenance (AIM) regional repair enhancements, recognition of dual sources of repair to properly assign repair actions for Two Level Maintenance items, logic to incorporate items with usage programs based on factors other than flying hours, and interim modifications to the model to deal with computer memory limitations on the classified production hardware system.

We completed and documented several DRIVE analyses. These were D035C-SBSS Asset Data Comparison, Configuration Data Impacts on DRIVE, Analysis of Ogden ALC Distribution Test, Representing Deployments in DRIVE Scenario Data, Depot Awaiting Parts (AWP) Management Policy, and Estimating Foreign Military Sales (FMS) Demands in DRIVE. We worked on a number of implementation and enhancements issues with the development contractor and ALC and MAJCOM users of DeskTop DRIVE to improve their capabilities to become more responsive to operational requirements.

We led a design effort to automate DRIVE distribution to take advantage of the waiver OSD granted for DRIVE to replace the standard UMMIPS system for allocating assets to Air Force customers. We also worked with our sponsor and Ogden to develop an approach for using the production DRIVE system to automate Express Table loading. For the Two Level Maintenance operation at Ogden ALC, this made use of an often overlooked D035K function and reduced movement time of unserviceable assets to depot repair shops by as much as four days. Additional DRIVE related accomplishments are included in the War Fighting Metrics, Lean Logistics, and Two Level Maintenance projects discussed separately in this Annual Report.

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TITLE: *Joint Logistics Systems Center (JLSC) Requirements Analysis Support*

CUSTOMER: HQ AFMC/LGI, JLSC/MMR

OBJECTIVE: Provide modeling support to the JLSC. We are providing the official Air Force expertise on math models used to compute spare parts requirements. The JLSC objective is to consolidate all computer processes for DOD requirements to one system (or one set of systems) that can be easily maintained by one organization.

RESULTS: We provided analyst support to the JLSC Math Models Group which included attending numerous meetings with the other components' analysis representatives who support the JLSC effort. Toward the end of the year, HQ AFMC/LGI became more involved in the JLSC effort allowing us to focus our work on the recoverable spares computation. We requested a copy of the Army's multi-echelon algorithm (SESAME) so we can compare it with the Aircraft Availability Model (AAM). In December, XPS received funding from the JLSC for one reimbursable position to support this effort.

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TITLE: *Wartime Logistics Awareness*

CUSTOMER: HQ AFMC/XP

OBJECTIVE: Establish a program to emphasize wartime logistics to senior operational command officers and enhance logistics representation within current wargames.

RESULTS: In January 1993, XPS received the "go ahead" to contract for a seminar wargame that would satisfy our stated objective. Working with ASC/PKW we developed a Statement of Work (SOW). The SOW described the development of a modified seminar wargame that provides a setting where senior operational commanders and key staff officers can gain an awareness of the logistics role of ensuring combat readiness and sustainment of forces. On 1 July 1993, the Logistics Enhanced Awareness Development (LEAD) contract was awarded to Kapos Associates Inc. (KAI).

After contract award development of the program began. A network of Air Staff and MAJCOM LEAD points of contact was established within CONUS and Europe. KAI then took the LEAD concept to the Major Commands, briefing the program structure and benefits.

XPS and KAI worked closely with ACC and developed the first of two dual major regional conflict scenarios to be played by the 9th and 12th Air Forces in 1994. The second scenario, developed with the assistance of AMC, will be played by the 15th Air Force.

In November of 1993, we hosted a successful validation of the first scenario. Subject matter experts from the Air Staff, 12th AF, AMC, AFCSSO, and AFMC provided many constructive comments/recommendations.

We continued to support the Air Force Wargaming Center wargame development. Specifically, we provided transportation parameters and theater stock levels and locations to support their efforts of establishing a logistics database for the ACES Dragon wargame.

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TITLE: *Readiness Based Initial Requirements Determination (RBIRD)*

CUSTOMER: AFSAC, OO-ALC/LAIM, SA-ALC/LAVFT

OBJECTIVE: Apply readiness based sparing (RBS) to foreign military sales (FMS).

RESULTS: We adapted the prototype RBIRD to calculate spares quantities for foreign military sales. RBIRD is a readiness based spares requirements computation system we developed for initial provisioning. We enhanced the capabilities of RBIRD by using the Aircraft Sustainability Model (ASM) for the spares calculation. ASM offers many useful features, such as cannibalization modeling, multiple levels of indenture, base-depot tradeoffs, and greater efficiency. The Air Force has been using ASM for several years to compute spares for war. It is also fully compatible with the Air Force's peacetime spares computation system (D041).

This enhanced version of RBIRD runs within Windows. It utilizes a data base for data management, and data entry is very similar in appearance and functionality to the current FMS spares requirements systems. The convenience of working in Microsoft Windows coupled with familiar FMS terminology makes the enhanced RBIRD very easy to use.

We completed initial testing of the enhanced system using actual data from OO-ALC/LAIM and SA-ALC/LAVFT. Benefits of the system include spares cost savings, inventory reduction, and improved aircraft availability.

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TITLE: *Depot Asset and Usage Data Analysis from Wholesale Data Interfaces*

CUSTOMER: HQ AFMC/LGI

OBJECTIVE: Provide analysis support to a cross functional team consisting of members from XP, LG, CI, and each ALC. As a member of the Requirements Interface Process Improvement Team (RIPIT), we are responsible for the analysis of all data received from the various systems that feed into the Recoverable Consumption Item Requirements System (D041), starting with the Wholesale and Retail Receiving and Shipping Process (D035K).

RESULTS: This year we decreased our over-all level of participation in this effort, but continued to maintain involvement in data analysis. Job-routed (JR) condemnation reporting continued to be a problem and did not get into D041 for half the year. As a result, we continued to produce a JR condemnation product that we sent out to each of the ALCs for use in their file maintenance period. For the September cycle, we verified a correction showing that these condemnations were now going through the system. We provided data to build a Metric comparing the quality and condition of data for each NSN as it is reported in D035A with what is shown in the D041 comp. During the year, we examined the tape interface for data systems in the D041 process. This involved looking at the actual data passes from D035A to D035C to D035A to D104. The results of this analysis led to the writing of Deficiency Reports (DRs) and Computer Systems Requirements Documents (CSRDs) to resolve errors in the systems. Examples of these errors include length of data fields and handling of assets in certain conditions. We also supported requests by the RIPIT functional team leader to provide data in various forms to the General Accounting Office (GAO).

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TITLE: *Independent Evaluation of the Logistics Assessment Models (LAMs)*

CUSTOMER: HQ USAF/LGS

OBJECTIVE: The LAMs consist of the Tactical LAM (TLAM) and Airlift LAM (ALAM). These models provide weapon system program managers and major command logistics programmers with an analytical tool that relates weapon systems and support funding to wartime capability. Our main objectives were to: 1) establish and maintain expertise within AFMC on the technical aspects of the LAMs being developed by the Air Staff, 2) provide LAMs familiarization to the AFMC staff, and 3) provide an independent evaluation of LAMs. The LAMs evaluation focused on their use in the following sustainability assessment applications: for Program Objective Memorandum (POM) evaluations, for Weapon System Program Assessment Reviews (WSPARs), for use in preparation of Weapon System Master Plans, and as a means of providing logistics constraints to sortie production in war fighting simulation models.

RESULTS: Our main thrust this year centered on evaluation of the LAMs. On occasion, we gave LAMs familiarization training to the AFMC staff. A highlight of our staff support was a request for help with the models for the Special Operations Forces (SOF) WSPAR. SOF concerns were focused on the validity of the initial assessments due to the varying nature and small size of the fleet. We worked in conjunction with Air Staff (HQ USAF/LGSI) to produce a quality assessment for the Program Review.

Our first objective of the LAMs evaluation was to reconcile the LAMs with their functional descriptions (FDs). The LAMs are written in the "C" programming language; therefore, we began by familiarizing ourselves with the language. Once confident with our ability to read the source code of the models, we began reconciling the code with the FD. We then developed an in-depth working knowledge of each model and its internal algorithms, specifically, the "Supply and Recovery" functions.

To evaluate LAMs sensitivity, we compared portions of the LAMs output to the output of other well accepted DOD models which share similar analysis objectives. We used Dyna-METRIC and DMAS, a derivative of Dyna-METRIC, as standards. We compared deviations in the results between a base case and excursions for LAMs, Dyna-METRIC, and DMAS. Deviations between LAMs and the standards were recorded and measured against established criteria.

As we discovered discrepancies during the evaluation, we reported t∵m to AF/LGSI who in turn corrected the model. We will complete a final report in 1994.

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TITLE: *DOD Readiness Task Force Support*

CUSTOMER: OASD (P&R)R&T

OBJECTIVE: We were asked to help develop a presentation to the Secretary of Defense appointed Readiness Task Force (RTF) on how the Air Force estimates readiness. As a follow-on to the presentation, the RTF gave the following tasking to AFMC: Given proposed funding levels contained in the President's Budget, forecast mission capable rates for a fighter, bomber, and airlifter for FY 94, FY 95, and FY 96 based on a major regional conflict (MRC) East scenario (or a more demanding scenario which includes MRC East).

RESULTS: We used the Logistics Assessment Models (LAMs) to accomplish this tasking. The Air Staff (AF/LGSI) provided inputs on expected future spares. They also provided estimates of expected Mission Capability (MC) for the end of peace/start of war. They used the Force Allocation Multi-Method Assessment System (FAMMAS) to provide these estimates. We then forecasted expected wartime mission capability for the F-15(A-D), F-15E, B-1B, and C-5 for fiscal years 94-97. Our analysis showed that in spite of very poor recent procurement funding, a dual MRC East plus MRC West scenario was mostly supportable for the weapon systems considered. However, to support these theaters, the non-engaged fleet would be sacrificed and unable to continue the programmed peacetime flying program.

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TITLE: *What are the Causes of Inactive Inventory*

CUSTOMER: HQ AFMC/LGI

OBJECTIVE: Determine the causes and magnitudes of varying types of inactive inventory. (Inactive inventory is the new term for any inventory over and above our current or expected need.)

RESULTS: We gathered inventory data for over 100,000 items for the past five years and analyzed it by comparing it to computed requirements for the same time period. This allowed us to identify, at a broad level, which NSNs entered an inactive status during this time period and when. We were also able to indicate how much of this migration into inactivity was due to unexpected changes in the repair/resupply pipelines, flying hours, and force structure. We provided this information to HQ AFMC/LG for use in the Inventory Reduction Program. We had originally planned more work on this project, but we terminated the project at this point since the information we provided satisfied our customer's requirement.

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TITLE: *Cost Analysis of Navy Depot versus Air Force Depot Efficiency*

CUSTOMER: HQ AFMC / LG

OBJECTIVE: Estimate the cost effectiveness of DOD aviation depot organic capabilities. The analysis was limited to the Maintenance Depot Production Cost of five Air Force depots and six Navy depots.

RESULTS: We used data from DOD's Depot Maintenance and Maintenance Support Cost Accounting and Production Reporting Handbook and DOD Accounting Manual. The Maintenance Depot Production Cost included labor cost, material cost, production indirect cost, and G & A cost. The analysis covered 1987 through 1992. We found that over the six year period, the average total depot production cost was consistently lower (12%-26%) for individual Air Force depots compared to Navy aviation depots. The Air Force also had a fairly stable cost rate during this time period, while the Navy's rate fluctuated considerably. We also found that for five out of the six years, the total average depot production cost per hour was lower for the Air Force than for the Navy.

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TITLE: *Analytic Support to the HQ Staff*

CUSTOMERS: HQ AFMC organizations

OBJECTIVES: Assist HQ AFMC organizations requiring quick reaction analytical support for specific issues.

RESULTS: We often help staff organizations analyze data for one-time questions that don't require extensive analysis. Two examples where we were able to quickly analyze data using spreadsheet tools were for the initial Banding work and for a manpower forecast.

Initial Support to RSD and SSD Banding (HQ AFMC/LGI): HQ AFMC/LG/FM needed a method of allocating limited FY 94 RSD and SSD funding across weapon systems and Air Logistics Centers. They were faced with a very short deadline for making the allocation. We developed a spreadsheet approach that used an exponential distribution to allocate the funds to specified Weapon System bands. This work preceded our longer term project reported under *Banding For Effectiveness* that directly considered aircraft availability impacts.

AFMC Acquisition Manpower Forecast (HQ AFMC/XPM): We helped HQ AFMC/XPM forecast acquisition manpower by developing a regression equation that used their data to relate acquisition manpower to acquisition budgets. The forecast related manpower to the amount of money received in a specific year.

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TITLE: *Support for the Development and Implementation of WSMIS*

CUSTOMER: HQ AFMC/LGI, MSC/SMW, MAJCOMs

OBJECTIVE: Improve the quality and usefulness of the Weapon System Management Information System (WSMIS) by designing enhancements and solving technical problems. Take an active role in providing technical assistance to the WSMIS functional management office, the WSMIS Program Office, the development contractors and users of the system.

RESULTS: We reviewed and tested several of the contractor-developed enhancements to the WSMIS Sustainability Assessment Module (SAM). But the primary issue with this system continues to be dirty data and how to deal with it. SAM now has the War Fighting Metric data validation and summary reports we designed last year. This year we started developing the next cleanup phase which compares two similar data bases (SAM and DRIVE) to identify contrasting information.

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TITLE: *DRIVE to Dyna-METRIC Linkage*

CUSTOMER: HQ AFMC/LGI, HQ AFMC/XPS

OBJECTIVE: Develop a software linkage of the DRIVE and Dyna-METRIC models to facilitate studies related to operational logistics support resulting from depot actions.

RESULTS: We developed software which converts DRIVE input files into Dyna-METRIC input files. This permits us to use Dyna-METRIC to evaluate the performance of DRIVE in terms of aircraft availability and sortie generation. The software was used to perform the Ogden ALC DRIVE distribution analysis and was a major component in the AFMC Warfighting Metric development effort. Copies were provided to other interested analysis groups.

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TITLE: *Depot Process Improvements*

CUSTOMER: HQ AFMC/LGI/XPS, ALCs

OBJECTIVE: Use the DRIVE model, data base, and management reports to help make depot process improvements that should result in pipeline reductions, cost reductions and/or customer support (availability) improvements. Use results to better integrate DRIVE into daily depot operations.

RESULTS: We began this project late in the year with a relatively informal team drawn from HQ AFMC/LGI and XPS, Ogden ALC, RAND and the DRIVE Production System contractors. Our initial focus was on additional improvements to Express Table loading at the depot, incorporating requisition prepositioning into the automated DRIVE distribution process, and reducing throughput in depot repair by improving repair component (bits and pieces) item availability. We expect the work to represent a major portion of our 1994 DRIVE effort.

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TITLE: *Demand Function Analysis*

CUSTOMER: HQ AFMC/XPS, HQ USAF/LGSI

OBJECTIVE: Investigate whether demands for aircraft recoverable spares appear to be a function of flying hours, sorties, landings, or some combination of the three.

RESULTS: This study could lead to improved accuracy in spares requirements computations and capability assessments if we are able to prescribe better demand forecasting techniques.

In 1993 we became familiar with the Air Force's Reliability and Maintainability Management Information System (REMIS) and collected flying program and aircraft status data for all aircraft in the inventory for the past 3 years. We also obtained D041 quarterly demand data for the same period. Our data collection included the Desert Shield/Storm experience which gave us a full range of aircraft utilization rates.

We imported C-5 and F-15 data into Excel spreadsheets and performed several regression analyses. We had hoped to find strong relationships, especially at the quarterly level, but results so far are inconclusive. We plan to conclude this study early next year after analyzing additional weapon systems.

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THE PROGRAM FOR 1994

In 1994 we expect a major focus will be to meet the challenges of improving the requirements process by working closely with our functional customers to implement Banding for Effectiveness to more effectively buy spares under limited funding. We will continue to emphasize analysis and resolution of the policy and implementation issues to field a responsive repair and distribution system (DRIVE) that will improve AFMC's support to the operating forces. We will continue to help get DeskTop DRIVE into the hands of appropriate functional users and anticipate a merging of the technology of DeskTop DRIVE and production DRIVE to achieve an eventual client-server type architecture. One effort this year will be to help ACC use DeskTop DRIVE in their operational test of the B-1B. Our major DRIVE efforts will be to finish definition of how to automate DRIVE distribution, make progress in using DRIVE methodology to set retail base stock levels, and take advantage of DRIVE to implement depot process improvements that should improve responsiveness and reduce resupply time. Many of the latter DRIVE efforts should coincide closely with Lean Logistics initiatives in the Command.

At the beginning of 1994, we demonstrated initial operating capability for the AFMC Warfighting Metric to estimate sustained wartime sortie generation capability due to recoverable spares support. We will continue to refine this capability during the year. We expect to complete up to four wargaming seminars to help senior leaders gain increased awareness of logistics constraints in war. We will continue to provide training to System Program Directors in the use of the Logistics Assessment Models (LAMs) and complete our evaluation of the logic of the LAMs models.

We are working closely with the Joint Logistics System Center (JLSC) to resolve issues raised by a consolidation of item requirements models within DOD. Our focus will be on a comparative analysis of the Army proposed multi-link modeling technique for spares requirements versus our proven Aircraft Availability Model multi-echelon methodology. We also plan to become more involved in the retail modeling issues being addressed by the JLSC. In addition, we are doing a comparative analysis of the forecasting methods in the Navy's Statistical Demand Forecasting (SDF) and the methods in the Air Force's Requirements Data Bank (RDB). We will analyze the impact of Two Level Maintenance on wartime capability and provide information to SPDs on what items may need augmented regional or other intermediate repair during war. We will continue our support to the development and implementation of improvements to WSMIS and our support to the analysis of data feeds to the D041 requirements computation system. We expect to complete an internally sponsored examination of the relationships among flying hours, landings, and sorties on item demands to see if we can gain any new insight about the drivers of demands. Finally, we will work with AFSAC to implement RBIRD into SAMIS for FMS customers to use for initial provisioning.

Our planned projects in our 1994 program follow.

Title: *RSD Banding For Effectiveness*

CUSTOMER: HQ AFMC/LG/FM/XR

OBJECTIVE: Develop a systematic process to aid AFMC in distributing Obligation Authority (OA) by ALC and Weapon System, and to provide item level guidance to the RSD item managers.

ANTICIPATED BENEFITS: AFMC had no systematic process for distributing and then spending funding (obligation authority) that is severely less than the computed budget. Last year we developed an off-line procedure to deal with large shortfalls. Having this or a similar procedure available to the item management community would enable AFMC to distribute and spend its OA in a timely manner. But since the procedure is somewhat cumbersome, we anticipate working with HQ AFMC/LGI representatives to develop a less cumbersome process that can be institutionalized in the command.

ESTIMATED COMPLETION DATE: Continuing through 1994

ANALYSTS: Frederick Rexroad
William Morgan
1st Lt Robert Block
(513) 257-6920; DSN 787-6920

TITLE: *DRIVE Production System (D087J/K) Support*

CUSTOMER: HQ AFMC/LGI, ALC Product Directorates

OBJECTIVE: Continue our support of the implementation of DRIVE as the Air Force technical OPR for the DRIVE model. Specific efforts will include technical assistance, model enhancements, design activities and analysis projects.

ANTICIPATED BENEFITS: DRIVE provides a means of explicitly linking depot support to operational needs. It will prioritize near term depot repair and distribution actions to best support the expected needs of the operational units within the constraints of the corporate Air Force priorities and repair funding. We will help ensure that the technical solutions for developing and implementing DRIVE are sound and provide a system which meets the needs of our customers.

ESTIMATED COMPLETION DATE: Continuing

ANALYSTS: Bob McCormick
Barbara Wieland
Capt Christian Dussault
Karen Klinger
(513) 257-6920; DSN 787-6920

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TITLE: *DeskTop DRIVE Support*

CUSTOMER: HQ AFMC/LGI, ALCs, MAJCOM/LGS, AFMC Det35

OBJECTIVE: Ensure DeskTop DRIVE capabilities mirror Production System capabilities while supporting user needs. DeskTop DRIVE is a PC based version of the AFMC Production System. It is being used by depot shops repairing Two Level Maintenance items, AFMC Detachment 35 at Kadena AB Japan, B52/KC-135 consolidated Intermediate Level Maintenance shops and the B-1B Interim Contractor Support function.

ANTICIPATED BENEFITS: A major benefit is to provide users a 'hands-on' option in using DRIVE, which in turn, should improve support to field units. The second major benefit would be the introduction of further process improvements, some of which may use DRIVE, to reduce depot pipelines and increase weapon system availability.

ESTIMATED COMPLETION DATE: Continuing

ANALYSTS: Bob McCormick
Capt Christian Dussault
Barbara Wieland
(513) 257-6920; DSN 787-6920

TITLE: *B1-B Test Support*

CUSTOMER: HQ ACC/LGS

OBJECTIVE: Support Air Combat Command (ACC) in its field test of the B-1B mandated by Congress to show the readiness capabilities of the aircraft. Help ACC use DRIVE for providing logistics support during the test.

ANTICIPATED BENEFITS: Our efforts will help guide ACC in their use of DRIVE for repair and distribution prioritization. The desired outcome is to show that the B-1B is a supportable aircraft and that it can meet its readiness targets.

ESTIMATED COMPLETION DATE: December 1994

ANALYST: Bob McCormick
(513) 257-6920; DSN 787-6920

TITLE: *Design for Automating DRIVE Distribution*

CUSTOMER: HQ AFMC/LGI

OBJECTIVE: Develop design alternatives for automating a DRIVE interface to the Stock Control System (D035). OSD granted a waiver for the Air Force to use DRIVE distribution priorities in lieu of the Uniform Material Movement and Issue Priority System (UMMIPS). The design process is complicated by JLSC limitations on D035 changes, Air Force direction to preposition requisitions (reduces pipeline time) and DRIVE program funding constraints.

ANTICIPATED BENEFITS: Automating DRIVE distribution priorities will reduce user workload, increase acceptance of DRIVE priorities and, ultimately improve weapon system availability.

ESTIMATED COMPLETION DATE: March 1994

ANALYST: Bob McCormick
(513) 257-6920; DSN 787-6920

TITLE: *Retail Stockage Levels for the Air Force*

CUSTOMER: HQ AFMC/LGI, MAJCOM/LGS

OBJECTIVE: Analyze alternative computational approaches, including DRIVE and Dyna-METRIC, to the Central Leveling System (D028) that computes retail stockage levels for selected recoverable items.

ANTICIPATED BENEFITS: This effort should lead to retail stockage postures which better support base availability goals. Several studies have shown the computational methodology used in D028 could be improved and that it is not consistent with the aircraft availability approach of DRIVE. We will build upon current RAND investigations of several alternative approaches . If an improved methodology is identified, then we will use the results as the basis for a systems analysis effort to define an implementation strategy.

ESTIMATED COMPLETION DATE: December 1994

ANALYSTS: Bob McCormick
Fred Riggins
Capt Christian Dussault
(513) 257-6920; DSN 787-6920

TITLE: *Depot Process Improvements*

CUSTOMER: HQ AFMC/LGI, ALCs

OBJECTIVE: Identify depot process improvements which result in pipeline reductions and improved support to AFMC customers. Improved support is measured in terms of better aircraft availability and/or reduced costs. The project is being operated through an informal group consisting of HQ AFMC/LGI and XPS, RAND, Ogden ALC and the DRIVE contractors. We anticipate other ALC participants as the project matures.

ANTICIPATED BENEFITS: This project should provide implemented depot process improvements which reduce pipeline times and improve spares support needed to meet aircraft availability goals. It will also help guide DRIVE Production System direction and better integrate DRIVE into daily depot operations.

ESTIMATED COMPLETION DATE: Continuing

ANALYSTS: Bob McCormick
Capt Christian Dussault
(513) 257-6920; DSN 787-6920

TITLE: *Logistics Enhanced Awareness Development (LEAD) Modified Seminar Wargame*

CUSTOMER: HQ AFMC/XP

OBJECTIVE: Provide a setting where senior operational commanders and key staff officers can gain an awareness of the logistics role in ensuring combat readiness and providing sustainment of committed and uncommitted forces. Four LEAD seminars are planned for FY 94.

ANTICIPATED BENEFITS: The awareness program provides a platform to promote an awareness of logistic issues and concepts not currently realized in most Air Force and Joint Chief of Staff sponsored wargames, exercises, or seminars.

ESTIMATED COMPLETION DATE: Ongoing

ANALYSTS: Capt Richard Moore
Mary Oaks
(513) 257-6920; DSN 787-6920

TITLE: *War Fighting Metrics for AFMC*

CUSTOMER: HQ AFMC/XPO, HQ AFMC/LGI

OBJECTIVE: Help AFMC determine its ability to provide required wartime logistics support to the operating forces and provide a convenient means to track the indicator at regular intervals. Indicators of AFMC's contribution to wartime mission effectiveness are desired at high levels (e.g., HORIZONS). They are also useful for MAJCOMs, System Program Directors (SPDs), and item managers.

ANTICIPATED BENEFITS: Timely, credible identification of potential problems with aircraft logistics support will lead to early solutions and more sorties. The area of logistics support addressed by this study is aircraft recoverable spares.

Last year we developed a system which can model the sortie generation capability of all aircraft for a 6-month war. That system will be further tested and enhanced this year to facilitate modeling of both peace and war bases. Other planned improvements include extensive audit reports, interfacing with REMIS historical MC rate data, adding engines, and expanded applications (sensitivity analysis, etc.).

ESTIMATED COMPLETION DATE: Continuing.

ANALYSTS: Michael Niklas
Capt Christian Dussault
Karen Klinger
Bob McCormick
(513) 257-6920; DSN 787-6920

TITLE: *Continued Evaluation of the Logistics Assessment Models (LAMs)*

CUSTOMER: HQ USAF/LGS

OBJECTIVE: Develop and maintain expertise within AFMC on the technical aspects of the LAMs being developed by the Air Staff. Provide ongoing independent evaluation of LAMs given the following applications:

        a. Sustainability assessments for the Program Objective Memorandum (POM).

        b. Sustainability assessments for Weapon System Program Assessment Reviews (WSPARs).

        c. Sustainability assessments for use in preparation of Weapon System Master Plans.

        d. As a means of providing logistics constraints to sortie production in war fighting simulation models.

ANTICIPATED BENEFITS: Having resident expertise and training provisions permits rapid technical assistance to AFMC users while decreasing the dependence on HQ USAF for LAMs support. The documented evaluation of the LAMs will afford the user the opportunity to judge LAMs applicability for a given assessment.

ESTIMATED COMPLETION DATE: We expect to complete the LAMs baseline evaluation of the series three version by April 1994.

ANALYSTS: Capt Richard Moore
1st Lt Robert Block
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TITLE: *Joint Logistics Systems Center (JLSC) Requirements Analysis Support*

CUSTOMER: HQ AFMC/LGI, JLSC/MMR

OBJECTIVE: Provide modeling support to the JLSC. We are providing the official Air Force expertise on math models used to compute spare parts requirements. The JLSC objective is to consolidate all computer processes for DOD requirements to one system (or one set of systems) that can be easily maintained by one organization.

ANTICIPATED BENEFITS: Our focus has recently shifted to analyzing the impact of JLSC decisions affecting our computation of recoverable spare parts. The Army is developing a concept which will compute spares using a readiness-based computation. Our analysis will determine if the Air Force can get comparable support under this new concept or if the Air Force should insist on retaining its current AAM algorithm. We will receive a copy of the Army's SESAME model (which is being adapted to support the new concept) and will be able to do a comparison of the two services' models.

ESTIMATED COMPLETION DATE: On-going

ANALYSTS: William Morgan
Frederick Rexroad
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TITLE: *JLSC Retail Requirements*

CUSTOMER: HQ AFMC/LGI/XPS, JLSC/MMR

OBJECTIVE: Provide Air Force input into the JLSC development of a DOD standard retail requirements model. The JLSC is just beginning to address a standard retail requirements model. The Air Force, unlike the other components, uses the same model(s) for wholesale and retail requirements. A group led by the Army completed a first draft of the functional requirements for a standard model in 1993. It will be coordinated through the service components and DLA. For 1994, we anticipate development of the functional requirements, identification of candidate models and initial analysis activity.

ANTICIPATED BENEFITS: The JLSC goal is to reduce logistics operating costs by developing standard data systems and models to support the component logistics functions. Our effort will ensure that Air Force needs are met within that framework.

ESTIMATED COMPLETION DATE: Continuing

ANALYST: Bob McCormick
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TITLE: *Comparison Study Between RDB Forecasting and Navy Statistical Demand Forecasting*

CUSTOMER: HQ AFMC/LGIW, JLSC/MMR

OBJECTIVES: Evaluate the accuracy and cost benefits of the Air Force forecasting technique used in the Requirements Data Bank relative to the Navy forecasting technique (Statistical Demand Forecasting). The purpose is to compare the two forecasting approaches in an Air Force environment

ANTICIPATED BENEFITS: Using the two analytical approaches mentioned above, a comparison will be achieved in terms of accuracy, stability, performance and operating cost. The results of this comparison will help us to make recommendations as to which forecasting approach would be most accurate and cost effective to the Air Force.

ESTIMATED COMPLETION DATE: October 1994

ANALYST: Capt Christian Dussault
(513) 257-6920; DSN 787-6920

TITLE: *Assessing the Effect of Two Levels of Maintenance During War*

CUSTOMER: HQ AFMC/XPO, HQ AFMC/LGI, SPDs

OBJECTIVE: Provide information to SPDs to help them determine if two levels of maintenance (TLM) can be an effective and sufficient support concept for deployed and fight-in-place units during wartime. We will also help them identify aircraft components which might require regional intermediate level maintenance during wartime.

ANTICIPATED BENEFITS: The wartime support concept for many avionics items and engines is being proposed to change from the current three levels of maintenance to TLM for the following weapon systems: A10, B1, B52, C5, C130, C141, E3, F15, F16, F111, and KC135. We are a member of a group headed by HQ AFMC/XPO that is addressing the question of whether or not TLM is a sufficient support concept in war. By applying some Air Force approved capability assessment models we will be able to show SPDs how TLM and other support alternatives are likely to affect wartime aircraft availability and sorties. We plan to use our newly developed 180 day wartime assessment capability to show the impact during the first six months of war.

ESTIMATED COMPLETION DATE: May 1994

ANALYST: Michael Niklas
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TITLE: *Support for the Development and Implementation of WSMIS*

CUSTOMER: HQ AFMC/LGI, MSC/SMW, MAJCOMs

OBJECTIVE: Improve the quality and usefulness of the Weapon System Management Information System (WSMIS) by designing enhancements and solving technical problems. Take an active role in providing technical assistance to the WSMIS Program Office, the development contractors and users of the system.

ANTICIPATED BENEFITS: Improved accuracy, usefulness, and responsiveness of WSMIS in areas which most need our support. Our technical expertise and experience with WSMIS enable us to provide fast, effective corrections and enhancements to the system. Anticipated reductions in funding will increase the demand for our services.

ESTIMATED COMPLETION DATE: Continuing.

ANALYSTS: Michael Niklas
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Barbara Wieland
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TITLE: *Depot Asset and Usage Data Analysis from Wholesale Data Interfaces*

CUSTOMER: HQ AFMC/LGI

OBJECTIVE: Provide analysis support to a cross functional team consisting of members from XP, LG, CI, and each ALC. The Requirements Interface Process Improvement Team (RIPIT) is responsible for the analysis of all data received from the various systems that feed into the Recoverable Consumption Item Requirements System (D041), starting with the Wholesale and Retail Receiving and Shipping Process (D035K).

ANTICIPATED BENEFITS: The D041 system depends heavily upon the depot-level data elements we plan to examine in this study. Through the correction of data and system improvements, the D041 buy and repair requirements projections should be more accurate. This will convert to both monetary savings and better mission support as well as savings in operating level time required to correct the data.

ESTIMATED COMPLETION DATE: On-going, but our participation will continue to decrease.

ANALYST: William Morgan
(513) 257-6920; DSN 787-6920

TITLE: *Demand Function Analysis*

CUSTOMER: HQ AFMC/XPS, HQ USAF/LGSI

OBJECTIVE: Investigate whether demands for recoverable aircraft spares appear to be more of a function of flying hours, sorties, landings, or a combination of the three.

ANTICIPATED BENEFITS: Identifying a relationship between demands and one or more of these factors could lead to improved accuracy in spares requirements computations and capability assessments. It could save money if a new computation results in less churn, i.e., if the spares requirement remains somewhat stable even though the flying hours and sorties change.

Currently the Air Force assumes that aircraft parts break in proportion to the number of accumulated flying hours. This is a linear relationship. Doubling the hours means doubling the demand for replacement parts. But many knowledgeable people believe that demands are more closely tied to the number of sorties. Their theory is that the most stress is applied during takeoff, performance of the mission, and landing; time spent cruising at a steady velocity is not perceived to be a big factor in part failures.

Planned changes in force structure and operations have elevated the importance and timeliness of this issue. In our work last year on this issue, we were unable to identify a definite relationship from the data we examined. We will continue with the work started last year.

ESTIMATED COMPLETION DATE: April 1994.

ANALYSTS: Michael Niklas
Capt Christian Dussault
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TITLE: *Readiness Based Initial Requirements Determination (RBIRD)*

CUSTOMER: AFSAC, OO-ALC/LAIM, SA-ALC/LAVFT

OBJECTIVE: Apply readiness based sparing (RBS) to foreign military sales (FMS).

ANTICIPATED BENEFITS: Inventory reduction, spares cost savings, improved aircraft availability, and consistency in FMS requirements determination.

Last year we adapted the prototype RBIRD, which is a readiness based spares requirements computation system for initial provisioning, to calculate spares quantities for foreign military sales. In 1994, we are being asked to assist in incorporating the enhanced RBIRD, or something very close to it, into the Security Assistance Management Information System (SAMIS). SAMIS is used by HQ AFMC, the Air Logistic Centers, and the Air Force Security Assistance Center (AFSAC) at WPAFB.

We will work with our customers to provide a readiness based sparing requirements system that can be accessed by all FMS customers.

ESTIMATED COMPLETION DATE: Dec 94

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CURTIS E. NEUMANN
Analytic Applications Function
Management Sciences Division

THE CONCEPT DEVELOPMENT FUNCTION

INTRODUCTION

The Concept Development Function has historically contributed to the goals of the Management Sciences Division in three areas: conducting studies, developing and using computer models, and providing technical support to the AFMC staff. The bulk of the work in the studies and the models area was in support of engines. With the transfer of much of the HQ AFMC engine functional work to SA-ALC, most of our engine workload disappeared. Therefore, this year has been the beginning of a transition to other workload. Also, some of the people spent a significant amount of time on projects documented under the Analytic Applications Function.

In the studies role, we conduct studies and assist other AFMC staff agencies in improving logistics policies and procedures, particularly in pipeline management areas. In doing the study and study support tasks, it is often necessary to use computer models to describe relationships and constraints within the logistics processes and to forecast what is likely to happen in the future or under different circumstances.

We have been continuing to develop and use the JEMS (Jet Engine Management Simulator) family of models. We have also been using the AAM (Aircraft Availability Model), Dyna-METRIC, and the DRIVE (Distribution and Repair in Variable Environments) model.

In our technical support role, we help the other staff offices and agencies in using models and mathematical and statistical techniques on a wide variety of topics. Much of this is done informally or as a member of a working group.

We have a staff of seven analysts, most of whom have advanced degrees in technical areas such as operations research, mathematics, or engineering. Each analyst tends to specialize in some major area of logistics management.

ACCOMPLISHMENTS IN 1993

During 1993 we worked on the Lean Logistics initiative, the OO-ALC DRIVE Distribution test, a few engine-related projects including a C-17 engine study, and a large number of projects in the technical support area.

Projects carried over from 1992 included the OO-ALC DRIVE Distribution test, the Engine Pipeline Study, Engine-related and Statistical Consulting, Support to the D028 Central Leveling System, Statistical Sampling of Library Usage Data, and the XPS Sun Computing Resource.

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Projects begun and completed in 1993 were the Air Force Audit Agency Indenture File Review, Statistical Analysis for the Personnel Office, Posture Planning, Training Budget for AFMC, and Complete Reliability Evaluation and Sensitivity Technique (CREST).

Projects begun in 1993 and carrying over into 1994 were Lean Logistics, Analysis of C-17 Engine and Module Maintenance Locations, Project 136, Analysis of Conformance Verification Program (CVP) data, and XPS Support of the Quality Air Force (Malcolm Baldrige Criteria).

The following write-ups summarize the more important projects and taskings.

TITLE: *Lean Logistics*

CUSTOMER: HQ AFMC/LGI

OBJECTIVE: Lean Logistics is an Air Force initiative to speed up the repair, procurement, and transportation processes to provide better support to the end users at the lowest possible cost. All process improvements developed under the Two-Level Maintenance initiative will be incorporated or further developed under Lean Logistics.

RESULTS: We supported this initiative in a number of ways. We participated on a team that used theory of constraints (TOC) tools on the reparable portion of the logistics process to identify core problems (e.g., depots tie efficiency to how busy they are rather than to repairing the right items) and to propose potential solutions (e.g., use the DRIVE model to better tie what the depot repairs to aircraft availability). We used the Aircraft Availability Model to test the effects of shortening resupply times on the peacetime spares requirements computation. One of the ideas for reducing resupply times involves a buffer stock concept of pulling most of the stock back from the bases into a centralized buffer with very fast transportation back to the bases as needed. We have been helping design a test of this concept which includes enhancing the DRIVE model to allow it to set stock levels at the bases and the centralized buffers.

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Frederick Rexroad
William Morgan
1Lt Robert Block
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TITLE: *Ogden ALC DRIVE Distribution Test*

CUSTOMER: HQ AFMC/LGI, OO-ALC/FMFDR

OBJECTIVE: There were several reasons that it was decided to do a DRIVE distribution test at Ogden ALC in conjunction with CORONET DEUCE, the F-16 avionics two-level maintenance test. It would demonstrate that DRIVE distribution fully supports the two-level maintenance concept. It would meet the CORONET DEUCE action item requirement for a "pro-active" distribution system. Also, it would help the DRIVE General Officer's Steering Group (GOSG) decide whether to automate DRIVE distribution.

RESULTS: The Ogden item managers (IMs) started using DeskTop DRIVE to help them distribute a number of F-16 avionics LRUs and SRUs in Dec 92 and continued using it throughout 1993. We assessed the support to the customers by converting the DRIVE input files from a number of months to Dyna-METRIC input files and running Dyna-METRIC for both war and peace. The aircraft availabilities in both war and peace went up over time. This showed the impact of what the item managers actually did. We also used a ninety day period starting in April 93 as a baseline to compare theoretical performance if pure UMMIPS rules or pure DRIVE rules were followed by the item managers. Pure DRIVE outperformed UMMIPS and what the item managers actually did. The DRIVE GOSG did decide in the spring of 1993 to automate DRIVE distribution.

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Capt Christian Dussault
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TITLE: *Analysis of C-17 Engine and Module Maintenance Locations*

CUSTOMER: ASC/YCL (C-17 SPO)

OBJECTIVE: To evaluate the following maintenance location options for the C-17 engine and modules and determine which provides the best aircraft availability. The maintenance options are:

> Organic depot overhaul with two module replacement centers (MRCs)
> Organic depot overhaul with one MRC and one quick engine change (QEC) center
> Organic depot overhaul with two QECs
> Contractor logistics support (CLS) overhaul with two MRCs
> CLS overhaul with two QECs

RESULTS: Simulation models have been developed for each of the maintenance options. The models address the details of the removal and replacement of whole engines from the aircraft and modules from the engine and their respective movement throughout the entire logistics system. The models transition from peacetime through wartime (surge and sustained) scenarios. This tasking began in March 1993 and will continue into 1994.

ANALYSTS: Harold Hixson
                  Tom Stafford
                  (513) 257-7408; DSN 787-7408

TITLE: *Engine Pipeline Study*

CUSTOMER: HQ AFMC/XRC

OBJECTIVE: To develop new engine pipeline reports encompassing all of the pipeline segments for both reparable and serviceable conditions. Also, support the Comprehensive Engine Management System (CEMS) programmers in implementing the needed changes to the current CEMS system.

RESULTS: We worked with CEMS analysts, programmers and representatives from the command engine managers to refine the pipeline reports to better meet the customers' needs. The engine pipeline reports are currently being programmed by CEMS programmers at OC-ALC. CEMS programmers estimate that this project will be completed by spring of 1994. No further action by XPS is expected in 1994.

ANALYST: Tom Stafford
                 (513) 257-7408; DSN 787-7408

TITLE: *Engine-related Consulting*

CUSTOMER: HQ AFMC/XRC

OBJECTIVE: To provide technical assistance to AFMC/XRC on engine-related projects.

RESULTS:

    a. We continued participating on a team headed up by OC-ALC/TI to consolidate and formalize the actuarial process from the current separate, non-standard systems into a single, standard system.

    b. We continued working to reduce the number of propulsion How Malfunction (HOWMAL) codes while providing improved data integrity for the users of this data. HQ AMC did some limited tests of the proposed new codes. Incorporating both the actuarial process improvements and the HOWMAL code reductions into the standard engine systems are now on hold because of funding and programmer support constraints.

    c. We developed a method of capturing and displaying XRC's input to the XR Warfighting Metric. The XRC input is a measure of how often each wartime tasked unit has valid WSMIS/SAM assessments of their Readiness Spares Package (RSP). The RSPs include whole engines.

ANALYST: Tom Stafford
              (513) 257-7408; DSN 787-7408

TITLE: *Project 136*

CUSTOMER: HQ AFMC/LGI

OBJECTIVE: Project 136 is an Air Force initiative to improve the wartime reparable parts status of the C5 and the C141. There was some debate about how much improvement would constitute enough. Should the wartime spares level be completely filled or just filled to the point that, when assessed with WSMIS/SAM, aircraft availability would approximate that before Desert Shield/Desert Storm?

RESULTS: We computed the cost to the Air Force to repair enough carcasses to completely fill the wartime reparable spares levels for the C5 and the C141. We also determined which stock numbers did not have enough carcasses that could be repaired to totally fill the wartime reparable spares levels for the C5 and the C141. This project will continue into 1994.

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TITLE: *Air Force Audit Agency Indenture File Review*

CUSTOMER: AFAA

OBJECTIVE: Review and correct the indenture files for D041 aircraft systems based upon audit information.

RESULTS: The Air Force Audit Agency conducted a review of the indenture file structure in the D041 Reparable Spares Division comparing the Application, Program, and Indenture (API) data from the Requirements Data Bank (RDB) with the current indenture file in D041. XPS analyzed some of the proposed changes to the indenture files using our version of the Aircraft Availability Model (AAM). We developed a methodology to correct errors in the indenture level files which in turn did affect the requirements calculation. The net savings from these proposed corrections to the production version of the AAM would result in not only reduced funding requirements, but also a better mix of aircraft parts.

ANALYSTS: Frederick Rexroad
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TITLE: *Statistical Analysis for the Personnel Office*

CUSTOMER: HQ AFMC/DPU

OBJECTIVE: Evaluate data supplied by DPU to determine whether statistically significant differences exist among various categories of AFMC emp..)yees regarding the amount of training received.

RESULTS: We analyzed data for employees at WPAFB and AFMC-wide. DPU now has statistical confidence in the meaning of their existing data relative to training of AFMC personnel. They are also aware of any significant areas and/or employee categories that need further management attention. We established a procedure for DPU to use in the future to perform their own analyses.

ANALYSTS: Don Casey
          1Lt Rob Block
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TITLE: *Posture Planning*

CUSTOMER: HQ AFMC/XPX

OBJECTIVE: To assist XPX by reviewing the processes involved in Base Closure and Mission Assignment decisions and to make recommendations on potential areas for process improvement.

RESULTS:

    1. Base Closure. The existing XPX process was very good, but we recommended that they use the Cost of Base Realignment Action (COBRA) model which is used DOD-wide rather than a locally developed model that closely paralleled COBRA but differed in some minor ways. We also recommended that they clarify the process flow chart by identifying the organizations involved, specifying who is responsible for each action, and better defining tasks that were separate but similar.

    2. Mission Assignment. The existing XPX process seemed to be very good but the documentation was not as far developed as in the Base Closure area. We recommended that they continue improving the documentation of the overall process and include an expanded method of weighting values, and the associated criteria, for each of the mission assignment evaluation factors. The revised "scoring" system developed by XPS was accepted by XPX.

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TITLE: *Training Budget for AFMC*

CUSTOMER: HQ AFMC/DPUM

OBJECTIVE: Help DPUM estimate the FY96-2001 funding requirements for civilian training.

RESULTS: Between the consolidation of AFLC and AFSC and the following downsizing, historical personnel data concerning changes in position responsibilities and the training classes taken by employees during the previous year had not been kept current. Therefore, DPUM could not estimate training requirements in their usual way. We and DPUM agreed that AFMC would use the currently approved O&M civilian workforce figures, based on years of service, and assume the historical retirement rate as employees reach the age of 55 and 30 years of service. That percentage was applied to each year (FY96-2001) and new people were assumed to be hired (moved) to backfill to the projected manpower ceilings. It was further assumed that two courses a year would be required for each of these new people and one course a year for everyone else. That number of courses was priced out at the actual FY92 unit cost rate per course inflated at 3.4% per year (the inflation rate specified by Air Staff).

ANALYST: Don Casey
(513) 257-7408; DSN 787-7408

TITLE: *Support to the D028 Central Leveling System*

CUSTOMER: HQ AFMC/LGI

OBJECTIVE: Provide technical support for the running and updating of the D028 Central Leveling System. Maintain a research version of D028 algorithm.

RESULTS: During 1993, the following tasks were accomplished:

1. Set an upper limit of 5 on the variance to mean ratio to bring D028 in line with the Aircraft Availability Model.

2. Provided the procedures to calculate the daily demand rate and the method used to update the date of first demand to AFMC/LGI to be included in the revision of AFM 67-1 Vol. III.

3. Assisted one of the WR-ALC item managers in resolving the problem with the large number of zero level (asterisk) items.

4. Assisted SA-ALC in resolving the D035C data feed problem during the first quarter 1993 processing of D028.

5. Provided AFMC/LGI a copy of the number of users by ALC with zero push levels and the number of users by ALC with zero daily demand during the last quarter 1992 to help them pinpoint potential problems.

6. Started building a historical data base by combining quarters of D028 history data.

This project will continue into 1994 to support the D028 customers and users of the history file as needed.

ANALYSTS: Fred Riggins
Steve Bankey
(513) 257-7408; DSN 787-7408

TITLE: *Statistical Sampling of Library Usage*

CUSTOMER: HQ AFMC/SVPL

OBJECTIVE: To determine and build an appropriate sampling method to use for collecting statistics on the number of people using AFMC libraries and the numbers of various types of resources which are checked out. Historically, this data has been collected every day and summarized for inclusion in Command/USAF-directed reports.

RESULTS: Using prior analyses of historical data from libraries at AFMC Air Logistics Centers, we created a sampling-based database system to perform the necessary calculations to produce information required to be included in Command/USAF-directed reports. We believe each library needs only collect data once per week, however, they can collect it as often as they want. We have begun live testing with the system. If SVPL accepts our analysis of the testing results, we will distribute the method to all AFMC libraries to provide a streamlined method of collecting required usage data and providing results to the Command Librarian (SVPL).

This tasking began in 1992 and will continue into 1994.

ANALYSTS: James S. Bankey
Don Casey
(513) 257-7408; DSN 787-7408

TITLE: *Analysis of Conformance Verification Program (CVP) Data*

CUSTOMER: HQ AFMC/ENM

OBJECTIVE: AFMC/EN developed the CVP several years ago to determine the quality of spare parts entering the Air Force inventory. Testing was done by each Air Logistics Center on a random sampling as well as on a pre-selected item basis. The tasking to XPS was to provide statistical analysis, including confidence levels and tests of hypothesis, of the AFMC-wide data.

RESULTS: This effort started in Aug 93, but data was not totally collected until the end of 1993. We expect to complete the analysis early in 1994.

ANALYST: Don Casey
(513) 257-7408; DSN 787-7408

TITLE: *Complete Reliability Evaluation and Sensitivity Technique (CREST)*

CUSTOMER: HQ AFMC/ENS

OBJECTIVE: Review the mathematical assumptions of a reliability and maintainability model developed for OO-ALC by "Support Systems Associates Inc." in 1987 called CREST. AFMC wants the CREST model to fulfill its need for a tool to measure the effects of reliability and maintainability improvements on the weapon system and on each of its assemblies and subassemblies.

RESULTS: We reviewed the contractor's final report "R&M Engineering in Developing and Implementing Economic Analysis Techniques, Life Cycle Costing Techniques and Weapon Systems Reliability Models" dated September 1987. We reported to ENS that we believe the mathematics documented in the report were appropriate. We didn't have a copy of the computer model so we didn't check out the actual code. OO-ALC was in the process of developing a way to verify/validate the model at the end of 1993. We agreed to remain available to do further work if necessary.

ANALYSTS: Don Casey
Tom Stafford
(513) 257-7408; DSN 787-7408

TITLE: Statistical Consulting Support

CUSTOMER: HQ AFMC Staff

OBJECTIVE: Provide a resource for use by all Headquarters organizations for consultation on statistical analysis. These "projects" range from short term (1-2 hours) to several days.

RESULTS: Example efforts this year:

      a. We helped 615 SMSQ/CIMI determine a sample size and procedures for a survey of command-wide users of data systems.

      b. We helped XPV select a random sample for a survey of Integrated Process Team (IPT) members. We developed a random number table for XPV and a spreadsheet for them to use to record and tabulate their survey results.

      c. We worked with AFMC/CEPL on an Air Staff directed task to relate space to manning. Each MAJCOM was requested to input manning projections for the out years and determine space requirements based on the regression equations that had been developed by the Air Staff using 1988 manning figures. A plan for phasing out any "excess" space at each base was also requested. It was determined that AFMC should ask for a waiver from this tasking since within the depot repair environment, space requirements are not well related to manning. The manning might be the same to support two different weapon systems, but because physical size could vary significantly, maintenance space requirements do not directly relate to manning.

ANALYST: Don Casey
                  (513) 257-7408; DSN 787-7408

TITLE: *XPS Support of the Quality Air Force (Malcolm Baldrige Criteria)*

CUSTOMER: HQ AFMC, HQ AFMC/XPV, ASC/TQ, ASC/YX

OBJECTIVE: Become skilled in the Baldrige Criteria and assess organizations' processes.

RESULTS: Two of our analysts were selected to become Baldrige Examiners for the Quality Air Force Quality Unit Award. We conducted three assessments this year. We first assessed ourselves focusing on strategic planning and senior leadership. We later reviewed the AFMC submission from the Air Force Development Test Center that went on to compete against other MAJCOM entries for the Air Force Quality Unit Award, and we reviewed the quality package built by ASC/YX, one of the System Program Offices in ASC. We expect to continue to be called on to support these quality efforts.

ANALYSTS: 1Lt Robert Block
William Morgan
(513) 257-6920; DSN 787-6920

TITLE: *XPS Sun Computing Resource*

CUSTOMER: HQ AFMC/XPS

OBJECTIVE: To acquire, install and maintain Sun Workstations with terminals in XPS to provide the computing power that had been provided by the CREATE system that was phased out in 1993.

RESULTS: One standalone system with 3 terminals was on line prior to 1993 and a second standalone system with 4 terminals was brought on line during the year. They have proven to be useful tools, but user and systems training has been a problem. Easy access both to data sets in their traditional, mainframe-based, 9-track tape formats and to DeskTop PC-based data sets have been problems. By the end of the year, there was a major effort to restructure the system to expand its availability and its computational and storage capacities. This involved networking the two standalone workstation/terminal systems with another workstation and terminal to provide common inter-system access by all 8 terminals and to provide traditional terminal and file-transfer access to all of the DeskTop PC systems in XPS. It also involved standardizing the administration of the existing workstation systems and upgrading the basic system software.

Work on this tasking began prior to 1993 and will continue into CY94.

ANALYSTS: James S. Bankey
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THE PROGRAM FOR 1994

During 1994 and beyond we expect to continue to support the staff and our other customers in conducting studies, developing and applying computer models, and providing technical support. The bulk of our work in the studies and computer model areas has historically been in support of engines. With the transfer of much of the HQ AFMC engine functional work to SA-ALC, most of our engine workload has disappeared. We will be completing the C-17 Engine Study in 1994, but expect to do very little other engine work. We began branching out into other areas during 1993. We started using the major analytic models supported by the Analytic Applications Function more. In 1994 we are planning to expand our simulation capabilities by getting an updated version of the General Purpose Simulator System (GPSS) programming language and installing the Logistics Composite Model (LCOM), a general purpose network simulator tool, on our Sun workstations.

Listed below is our known 1994 workload at this time.

TITLE: *Lean Logistics*

CUSTOMER: HQ AFMC/LGI

OBJECTIVE: Lean Logistics is an Air Force initiative begun in March 1993 to speed up the repair, procurement, and transportation processes to provide better support to the end users at the lowest possible cost to the Air Force. All process improvements developed under the earlier Two-Level Maintenance initiative will be incorporated or further developed under Lean Logistics.

ANTICIPATED BENEFITS: We have been supporting this initiative in a number of ways. We've helped identify problems with the reparable portion of the logistics process and propose potential solutions. We have estimated savings in the peacetime spares requirements if the resupply times can be shortened. We expect to be heavily involved in the level-setting portion of the upcoming tests of the buffer stock concept. This concept consists of pulling most of the base stock back to a centralized buffer with very fast transportation of the stock back to the bases as needed. Expected benefits include less maldistribution of stock among bases, less unnecessary work in progress in depot repair, and better focus at the depots on what really needs to be repaired.

ESTIMATED COMPLETION DATE: Continuing.

ANALYSTS: Barbara Wieland
Bob McCormick
(513) 257-6920; DSN 787-6920

TITLE: *Analysis of C-17 Engine and Module Maintenance Locations*

CUSTOMER: ASC/YCL (C-17 SPO)

OBJECTIVE: To complete our evaluation of the following maintenance location options for the C-17 engine and modules:

Organic depot overhaul with two module replacement centers (MRCs)
Organic depot overhaul with one MRC and one quick engine change (QEC) center
Organic depot overhaul with two QECs
Contractor logistics support (CLS) overhaul with two MRCs
CLS overhaul with two QECs

We also intend to perform sensitivity analysis on resources (i.e., test cells, module and engine spares) and various pipeline times. We will validate the simulation results by comparing the results with output from Dyna-METRIC (version 4.6).

ANTICIPATED BENEFITS: To provide insight into operational impacts, such as operational readiness and repair bottlenecks, that will assist the C-17 SPO in making smarter decisions about maintenance concepts for the C-17 engine and modules.

ESTIMATED COMPLETION DATE: This tasking began in 1993 and we expect to complete it in April 1994.

ANALYSTS: Harold Hixson
Tom Stafford
(513) 257-7408; DSN 787-7408

TITLE: *Project 136*

CUSTOMER: HQ AFMC/LGI

OBJECTIVE: Project 136 is an Air Force initiative begun in 1993 to improve the wartime reparable parts status of the C5 and the C141. There was some debate about how much improvement would constitute enough. Should the wartime spares levels be completely filled or just filled to the point that, when assessed with WSMIS/SAM, aircraft availability would approximate that before Desert Shield/Desert Storm?

ANTICIPATED BENEFITS: We have already computed the costs to repair enough carcasses to totally fill the C5 and C141 wartime spares levels. We also identified the stock numbers that are carcass-short. We will be doing more analysis to determine if it is possible to repair enough carcasses in the AFMC depots to appreciably improve the C5/C141 aircraft availability as determined with WSMIS/SAM.

ESTIMATED COMPLETION DATE: We expect to complete this project early in 1994.

ANALYSTS: 1Lt Robert Block
Barbara Wieland
(513) 257-6920; DSN 787-6920

TITLE: *Support to the D028 Central Leveling System*

CUSTOMER: HQ AFMC/LGI

OBJECTIVES: Provide technical support for running and updating the D028 Central Leveling System. Maintain a D028 output history data base. Maintain a research version of the D028 algorithm.

ANTICIPATED BENEFITS: Provide technical expertise for resolving D028 problems that may surface and for D028 updates. Have a version of the D028 algorithm available for testing improvements and modifications of the algorithm. Have a data base readily available for doing special studies and data analysis.

ESTIMATED COMPLETION DATE: Continuing.

ANALYSTS: Fred Riggins
Steve Bankey
(513) 257-7408; DSN 787-7408

TITLE: *Statistical Sampling of Library Usage*

CUSTOMER: HQ AFMC/SVPL

OBJECTIVES: To provide an appropriate sampling-based method to use for collecting statistics on the number of people using AFMC libraries and the numbers of various types of resources which are checked out.

ANTICIPATED BENEFITS: The methods that the AFMC librarians currently use to collect, maintain, and report their usage statistics are inconvenient: the basic information must be acquired every day that a given library is open (and continuously while it is open). The computer-based statistical-sampling method that we have proposed (and are testing) should allow the librarians to collect similar information, but less often than before, and, therefore, with less overall effort and, we hope, more accuracy. Output products will then show statistical projections, rather than summaries of collected values.

ESTIMATED COMPLETION DATE: June 1994

ANALYSTS: James S. Bankey
Don Casey
(513) 257-7408; DSN 787-7408

TITLE: *Analysis of Conformance Verification Program (CVP) Data*

CUSTOMER: HQ AFMC/ENM

OBJECTIVE: The CVP was developed several years ago to determine the quality of spare parts entering the Air Force inventory. Testing was done by each Air Logistics Center on a random sampling as well as on a pre-selected item basis. XPS agreed to provide statistical analysis, including confidence levels and tests of hypothesis, of AFMC-wide data.

ANTICIPATED BENEFITS: ENM will have a statistical basis for driving corrective action in the acquisition process.

ESTIMATED COMPLETION DATE: March 1994.

ANALYST: Don Casey
(513) 257-7408; DSN 787-7408

TITLE: *AFMC Depot Manpower Programming*

CUSTOMER: HQ AFMC/XPM

OBJECTIVE: Define AFMC depot manning requirements (organic and contractor) by weapon system. A method should be developed to relate changes in weapon system activity (inventory, flying hours, complexity, organic/contractor mix, etc.) to manning broken down by Program Element Codes.

ANTICIPATED BENEFITS: An algorithm to show how manning is related to weapon system factors will assist USAF in establishing not only new manning authorizations as the Air Force downsizes but also more defensible manning authorizations.

ESTIMATED COMPLETION DATE: New project. A completion date has not been established.

ANALYSTS: Don Casey
Capt Richard Moore
(513) 257-7408; DSN 787-7408

TITLE: *XPS Support of the Quality Air Force (Malcolm Baldrige Criteria)*

CUSTOMER: HQ AFMC, HQ AFMC/XPV, ASC/TQ

OBJECTIVE: To provide highly skilled Baldrige qualified examiners to help assess organizations' processes in support of the Commander's pursuit of excellence in our Quality program and processes. 1993 was a trial run for the headquarter's two-letter organizations' preparations to compete in a Baldrige-type competition.

ANTICIPATED BENEFITS: AFMC believes that participating in quality competitions encourages its organizations to truly improve their processes. We are more than willing to provide analysts experienced in examiner skills to help the total quality effort.

ANALYSTS: 1Lt Robert Block
William Morgan
(513) 257-6920; DSN 787-6920

TITLE: *XPS Sun Computing Resource*

CUSTOMER: HQ AFMC/XPS

OBJECTIVE: To maintain a network of Sun Workstations in XPS to provide the computing resources to replace those that had been provided by the CREATE mainframe system which was phased out in 1993. To provide training to help XPS personnel use the workstations effectively.

ANTICIPATED BENEFITS: These computing resources will provide XPS with shared, multi-user data storage and computing power that was most recently provided by the CREATE mainframe data system for the large data sets and computation-intense projects that we tackle, but which has been unavailable since CREATE was shut down in 1993.

ESTIMATED COMPLETION DATE: Ongoing

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Barbara J. Wieland

BARBARA J. WIELAND
Concept Development Function
Management Sciences Division

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ACRONYMS

AAM	Aircraft Availability Model
AAPM	Aircraft Availability Procurement Model
ACC	Air Combat Command
ACIM	Availability Centered Inventory Model
AETC	Air Education and Training Command
AFAA	Air Force Audit Agency
AFIT	Air Force Institute of Technology
AFLMA	Air Force Logistics Management Agency
AFMC	Air Force Materiel Command
AFSAC	Air Force Security Assistance Center
AFWC	Air Force Wargaming Center
AIM	Alternatives to Intermediate Maintenance
ALAM	Airlift Logistics Assessment Model
ALC	Air Logistics Center
ALT	Administrative Leadtime
AMC	Air Mobility Command
API	Application, Program, and Indenture
APU	Auxiliary Power Unit
ASM	Aircraft Sustainability Model
AWM	Awaiting Maintenance
AWP	Awaiting Parts
BCR	Baseline Change Request
BLSS	Base Level Self-Sufficiency Spares (now IRSP)
C-Ratings	Combat Ratings
CAIG	Cost Analysis Improvement Group
CAMS	Core Automated Maintenance System
CEMS	Comprehensive Engine Management System
CIM	Corporate Information Management
CLS	Contractor Logistics Support
COBRA	Cost of Base Realignment Actions
CONUS	Continental United States
COTS	Commercial-Off-The-Shelf
CPU	Central Processing Unit
CREATE	An AFMC Scientific Computer System
CSE	Common Support Equipment
CSF	Critical Success Factor
CSMS	Combat Supplies Management System
CSRD	Comm-Computer Systems Requirement Document
D028	Central Leveling System
D035	Stock Control System
D035C	Recoverable Assembly Management Process
D035K	Wholesale and Retail Receiving and Shipping Process
D041	Recoverable Item Requirements System

D042	Comprehensive Engine Management System
D087C	Sustainability Assessment Module
D087J/K	AFMC DRIVE Production System
D104	Worldwide Stock Balance & Consumption System
DDR	Daily Demand Rate
DFIO	DRIVE Functional Integration Office
DLA	Defense Logistics Agency
DLSIE	Defense Logistics System Information Exchange
DMAS	Dyna-METRIC Microcomputer Analysis System
DMIF	Depot Maintenance Industrial Fund
DMMIS	Depot Maintenance Management Information System
DMRD	Defense Management Review Decision
DMSC	Depot Maintenance Support Center
DOD	Department of Defense
DR	Deficiency Report
DRC	Dynamics Research Corporation
DRCQ	Depot Repair Cycle Quantity
DRIVE	Distribution & Repair in Variable Environments
DTDRIVE	DeskTop DRIVE
Dyna-METRIC	Dynamic Multi-Echelon Technique for Recoverable Item Control
EA	Executive Agent
EEIC	Element of Expense Investment Code
EIS	Executive Information System
EMS	Enhanced Multi-Echelon System
ENMCS	Engine Not Mission Capable - Supply
EOQ	Economic Order Quantity
ERO	Engine Review Organization
FAMMAS	Funding/Availability Multi-Method Allocator for Spares
FD	Functional Description
FMS	Foreign Military Sales
FOC	Full Operating Capability
GAO	General Accounting Office
GOSG	General Officer Steering Group
GPSS	General Purpose Simulation System
GWAM	Get Well Assessment Module
HOWMAL	How Malfunction
ICS	Interim Contractor Support
IM	Item Manager
IMDE	Integrated Model Development Environment
IMP	Inventory Management Program
IOC	Initial Operating Capability
IPT	Integrated Product Team
IRD	Initial Requirements Determination
IRP	Inventory Reduction Plan
IRSP	In-place Readiness Spares Package (formerly BLSS)

IWSM	Integrated Weapon System Management
JEIM	Jet Engine Intermediate Maintenance
JEMS	Jet Engine Management Simulator
JLSC	Joint Logistics Systems Center
JR	Job-Routed
KAI	Kapos Associates Inc.
LAMs	Logistics Assessment Models
LCOM	Logistics Composite Model
LEAD	Logistics Enhanced Awareness Development
LL	Lean Logistics
LMI	Logistics Management Institute
LMS	Logistics Management System
LRU	Line Replaceable Unit
M&S	Models & Simulations
MAJCOM	Major Command
MC	Mission Capability
MDS	Mission Design Series
METRIC	Multi-Echelon Technique for Recoverable Item Control
METRICs	Measures of Performance
MIC	Maintenance Inventory Center
MICAP	Mission Capability
MOD-METRIC	Modified Multi-Echelon Technique for Recoverable Item Control
MRC	Major Regional Conflict
MRC	Module Replacement Center
MRSP	Mobility Readiness Spares Package
MSOR	Multiple Sources of Repair
MTBD	Mean Time Between Demands
MTBF	Mean Time Between Failure
NIIN	National Item Identification Number
NSN	National Stock Number
O&M	Operations & Maintenance
O&ST	Order and Ship Time
OA	Obligation Authority
OCM	On-Condition Maintenance
OIM	Organizational Intermediate Maintenance
OMENS	Opportunistic Maintenance Engine Simulator
OPR	Office of Primary Responsibility
OSD	Office of the Secretary of Defense
OWLP	Overseas Workload Program
PA	Program Authority
PAA	Primary Aircraft Authorized
PACAF	Pacific Air Forces
PC	Personal Computer
PLT	Production Leadtime
PMC	Propulsion Managers Conference

PMO	Program Management Office
POM	Program Objective Memorandum
PPBS	Planning, Programming and Budgeting System
PRS	Propulsion Requirements System
PSE	Plan for Sustaining Engineering
QEC	Quick Engine Change
RADM	Resource Allocation Decision Model
RBIRD	Readiness Based Initial Requirements Determination
RBS	Readiness Based Sparing
RDB	Requirements Data Bank
REALL	Reallocation Module
REALM	Requirements/Execution Availability Logistics Module
REMIS	Reliability & Maintainability Information System
RIPIT	Requirements Interface Process Improvement Team
RIT	Reparable in Transit
ROME	Reliability Operations Maintenance Engineering
RSD	Reparable Stock Division
RSP	Readiness Spares Package (formerly WRSK)
RTF	Readiness Task Force
SAM	Sustainability Assessment Module
SAMIS	Security Assistance Management Information System
SB&CR	Stock Balance and Consumption Report
SBSS	Standard Base Supply System
SC&D	Stock Control and Distribution
SCS	Stock Control System
SDF	Statistical Demand Forecasting
SECDEF	Secretary of Defense
SESAME	Selected Essential Item Stockage for Availability Method
SFDLR	Stock Funding of Depot Level Reparables
SMG	Supply Management Group
SOF	Special Operations Forces
SORCE	Simulation of Removals of Components & Engines
SOW	Statement of Work
SPD	System Program Director
SPO	System Program Office
SRAN	Stock Record Account Number
SRU	Shop Replaceable Unit
SSD	System Support Division
STOM	Supply to Maintenance
SWAP	Spares Wartime Assessment Procedure
TASC	The Analytical Sciences Corporation
TLAM	Tactical Logistics Assessment Model
TLM	Two Level Maintenance
TNMCS	Total Not Mission Capable - Supply
TOC	Theory of Constraints

TQM	Total Quality Management
TRADES	Theater Repair & Distribution Execution System
UMMiPS	Uniform Materiel Movement & Issue Priority System
WFM	War Fighting Metric
WRM	War Readiness Materiel
WRSK	War Readiness Spares Kit (now RSP)
WSAM	Weapon System Availability Model
WSMIS	Weapon System Management Information System
WSPAR	Weapon System Program Assessment Review

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Distribution List

HQ AFMC			ALCs				
CC	1		OC-ALC/FM	1		AFIT/LAC	1
CV	1		OO-ALC/FM	1		AFIT/YCL	1
CI	1		OO-ALC/FMFDR	1			
DPU	1		OO-ALC/LAIM	1		AIR UNIVERSITY/EC	1
EN	1		SA-ALC/FM	1			
ENM	1		SA-ALC/LAVFT	1		DTIC	2
ENS	1		SM-ALC/FM	1			
FMO	1		WR-ALC/FM	1		DLSIE	2
FMR	1						
HO	1		AFSAC/CC	1		AMXSY-LM	1
IG	1						
LG	1		JLSC/MMR	1		RAND Corp.	1
LGI	5						
LGM	1		HQ USAF			LMI	1
LGP	1		LGS	1			
LGS	1		LGM	1			
LGT	1		LGX	1			
PA	1		XOO	1			
PK	1						
SVPL	1		AFAFC/CC	1			
ST	1		AFLMA				
XP	1		CC	1			
XPM	1		LGM	1			
XPO	1		LGS	1			
XPS	50		LGT	1			
XPV	1		LGX	1			
XPX	1		LGY	1			
XR	1		XP	1			
XRA	1		AFSAA/SA	1			
XRB	1						
XRC	1		ACC/LG	1			
XRJ	1		AMC/LG	1			
XRM	1		AETC/LG	1			
XRS	1		DLA/LO	1			
XRT	1		PACAF/DOQ	1			
XRW	1		PACAF/LG	1			
XRX	1		USAFE/LG	1			
MSC			AF ACADEMY/DF	1			
CC	1						
SMW	1		AFIT/EN	1			
			AFIT/LG	1			